4-24-2007

UNH Students Without Borders Draw Water From The Sand

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April 24, 2007

DURHAM, N.H. -- The University of New Hampshire's Students Without Borders (SWB) will participate in the Environmental Protection Agency's National Sustainable Design Expo in Washington, D.C. April 24 and 25 with its Water from the Sand project. SWB is the UNH Chapter of the Engineers Without Borders-USA (EWB-USA) program: a non-profit humanitarian organization that partnerships with foreign communities to implement sustainable engineering projects. For this project SWB collaborated with RAIN for the Sahel and Sahara (RAIN), a non-profit organization based in UNH's neighboring town of Newmarket. RAIN's mission is to develop and support residential schools for children of the semi-nomadic Tuareg people.

The Expo, on the National Mall, is the showcase for EPA's third annual P3 (People, Prosperity and the Planet) Award competition. More than 300 college and university students (and their faculty advisors) from around the country will be exhibiting their designs for a sustainable tomorrow and competing for the prestigious EPA P3 Awards.

When UNH's SWB arrived in Niger in January of 2007 to implement their low-technology pumping system, either animal-powered water extraction with trench irrigation or gasoline-powered pumps with drip irrigation methods were employed. While drip irrigation is the preferred method, utilizing non-renewable resources for energy is not. The challenge of this project is significant in the developing world, specifically in the Air Massif region of Niger, the poorest country in the world. A sustainable water extraction system is needed to irrigate community gardens. These gardens produce a basic need – food -- for children attending boarding schools as well as a cash crop for funding of these boarding schools, which receive little or no funding from the government. With schools offering education, better nutrition, and a place for the children of the semi-nomadic Tuareg people to live, more parents will be supportive of children attending school, and more children will become educated (current literacy rate is less than 12%).

During their January visit, SWB was able to design a culturally acceptable, easily understood (by the students and locals), sustainable and efficient water extraction system, an animal-powered rope and washer pump. The pump is successful at delivering the necessary water for the garden (2000 gal/day). The design consists of a pump that extracts water from a well into a cistern for use in a drip irrigation system. The pump system is powered by a harnessed camel walking in a circular path. The pump operates at six gallons per minute, needing about five hours of operation each day. The camel will eventually not need the gardener's assistance to walk the circle; it will learn to do it on its own. Animal power (especially camel power) is common in Niger, very reliable and culturally acceptable as well. Although there were challenges during the actual construction, it was a group effort by the students, mentor, and villagers. The necessary materials were obtained and the villagers offered labor and time to the project. Because the pump design and operation are culturally acceptable and easily understood, the villagers are using it and will be able to perform any required maintenance.

The Water from the Sand project makes huge strides in sustainability and ties in people, prosperity, and planet. The unsustainable gasoline-powered pump was replaced with an efficient animal-powered pump made primarily with local materials. Besides the materials being local, many of them were also recycled. The bearing for the animal power wheel was an old car bearing. The washers for the pump were made by local women leather artisans from recycled tires. A local welder made the frame from the pump from locally available materials. Recycled tires were also used for the wheels for moving the rope through the rope and washer pump. The people of Niger (Tuareg and children) and the U.S. (students and engineers) have been impacted positively by this project. By increasing opportunities for better education and nutrition, this area of Niger can become more prosperous. Also, this project was conducted keeping sustainability in mind the entire time. Besides helping the planet by doing this, the project became even more culturally acceptable and simple for many to understand. This project is intended to be a transferable technology. The desire for SWB to speak about their experiences to many people from schools to professional societies demonstrates the group's commitment to maximizing the overall impacts of this project.

The following UNH students traveled to Washington for the P3 Competition: Whitney Blanchard (graduate student, Environmental Engineering), Lonni Peterson (first-year, Environmental Engineering), Kim Morris (senior, Environmental Engineering), Katie Brown (senior, Public Health), Naoufal Souitat (graduate student, Mechanical Engineering). Other SWB students involved in helping to prepare for travel and competition include Amanda Loughlin (sophomore, Environmental Engineering), Michael Allard (junior, Mechanical Engineering), Danielle Laroche (senior, Public Health).

At the Expo, students will show novel approaches for green design and buildings, innovative alternative energy and materials, and clean drinking water treatment technologies. This will also be an excellent opportunity for students to learn about jobs, fellowships, internships, and post-doctoral positions within the federal government and in nonprofit organizations. Federal and state grant information will also be available. To get more information about the Expo and the P3 Award competition, visit: www.epa.gov/P3 or contact Cynthia Nolt-Helms, EPA National Center for Environmental Research, at nolt-helms.cynthia or (202) 343-9693.

For additional information on SWB at the University of New Hampshire, go to http://www.unh.edu/ewb/.

High resolution graphics and captions available to download:

http://www.ceps.unh.edu/images/DSC00065.JPG

Working hand in hand with locals: Matt Polzin (graduate student, liberal studies-community planning) and Eric Reitter, PE (SWB Professional Mentor) work with a Villager in Niger to assemble the animal power wheel for a rope and washer pump designed by Students Without Borders.

http://www.ceps.unh.edu/images/100_1578.JPG

Working hand in hand: Kim Morris (Environmental Engineering-IP), Katie Brown (Public Health) and Tim Corrigan (Civil Engineering) work with Villagers in Niger to implement a rope and washer pump the students designed.

http://www.ceps.unh.edu/images/DSC01404.JPG

Working Hand in Hand: The Students Without Borders implementation team (Kim Morris (ENE-IP), Eric Reitter, PE, Katie Brown (Public Health), Tim Corrigan (CIE), and Matt Polzin (LS)) are shown with local villagers who assisted with the construction and welding of a rope and washer pump that successfully delivers six gallon per minute of water to irrigate school community gardens to grow food for the students in Niger, West Africa.